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10/684,520	10/15/2003	Mee-Ae Ryu	P56897	4180

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EXAMINER	
SANEI, HANA ASMAT	
ART UNIT	**PAPER NUMBER**
2879	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/684,520	RYU ET AL.
	Examiner	Art Unit
	Hana A. Sanei	2879

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9-30 and 32-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-30 and 32-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/27/06 has been entered.

Claims 1-7, 9-30, 32-41 are pending in the instant application.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1a. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Chuang et al (US 6062931).

Regarding Claim 1, Chuang teaches first and second substrates (11, see at least Fig. 6 and "top assembly which comprises a glass plate (not shown)", Col. 2, lines 8-10) provided opposing one another with a predetermined gap therebetween to form a

vacuum assembly (10^{-7} torr, Col. 2, lines 12-14); electron emission sources (32) provided on one of the first and second substrates; an electron emission inducing assembly (12, cathode columns & 16, gate lines) inducing the emission of electrons from the electron emission sources; and an illuminating assembly (top assembly, coated with phosphor layer, Col. 2, lines 8-10) provided on the other one of the first and second substrates not including the electron emission sources being formed, the illuminating assembly realizing images by the emission of electrons from the electron emission sources (Fig. 6) , with the electron emission sources including a carbon nanotube layer (32, array of carbon nanotubes, Col. 4, lines 29-31) and a base layer (61, discontinuous layer), the base layer having an outer surface that includes prominences and depressions (see Fig. 6, 61), the base layer connecting the carbon nanotube layer to the one of the first and second substrates on which the electron emission sources are provided and having conductibility (iron, nickel, cobalt, and other transition metals, Col. 4, lines 17-19) for applying a voltage to the carbon nanotube layer required for the emission of electrons, the carbon nanotube layer comprising a plurality of carbon nanotubes (32, array of carbon nanotubes) and with the base layer having a predetermined thickness, and the carbon nanotube layer including carbon nanotubes of the carbon nanotube layer being provided on the base layer in a state substantially un-mixed with the base layer (unmixed, see Fig. 6).

1b. Claims 1, 5-6, 9-10, 15, 24-29, 32-33, 38-1 are rejected under 35 U.S.C. 102(b) as being anticipated by Uemura et al (US 6239547 B1).

With respect to Claim 1, Uemura discloses a field emission display (Figure 4), comprising: first (faceplate, 402) and second substrates (ceramic substrate, 406a) provided opposing one another with a predetermined gap there between to form a vacuum assembly (Col. 7, lines 4-6); electron emission sources (421) provided on one of the first and second substrates; an electron emission inducing assembly (406b) inducing the emission of electrons from the electron emission sources; and an illuminating assembly (phosphor screen, 404) provided on the other one of the first and second substrates not including the electron emission sources being formed, the illuminating assembly realizing images by the emission of electrons from the electron emission sources, with the electron emission sources including a carbon nanotube layer (421) and a base layer (conductive adhesive, 422), base layer (703, Figure 7) has an outer surface that includes prominences and depressions (see Figure 7), the base layer connecting the carbon nanotube layer to the one of the first and second substrates on which the electron emission sources are provided and having conductibility for applying a voltage to the carbon nanotube layer required for the emission of electrons, the carbon nanotube layer comprising a plurality of carbon nanotubes (graphite columns, 421), and with the base layer having a predetermined thickness, and the carbon nanotube layer including the carbon nanotubes of the carbon nanotube layer being provided on the base layer in a state substantially un-mixed with the base layer, with the base layer having a substantially vertical flank (Figure 4).

With respect to Claim 5, Uemura teaches a that the base layer (conductive adhesive, 422) includes an adhesive material having conductibility selected from the

group consisting of silver, nickel, aluminum, gold, cobalt, and iron (silver, Col. 7, lines 29-31).

With respect to Claim 6, Uemura teaches a that the base layer (conductive adhesive, 422) includes a metal conductive material selected from the group consisting of silver adhesive material having conductibility selected from the group consisting of silver (Col. 7, lines 29-31).

With respect to Claim 9, Uemura teaches that the base layer (905, see at least Fig. 9B) includes spherical particles with a diameter of 0.05 to 5 μm, creating prominences and depressions (Fig. 7E) on outer surface of the base layer accommodating the same prominences and depressions in the carbon nanotube layers, below the carbon nanotube layer (Col. 5, lines 42-45; Col. 11, lines 65-67; Col. 17, lines 10-11; Col. 11, lines 13-17).

With respect to Claim 10, Uemura teaches that the spherical particles are conductive metal particles selected from the group consisting of silver, copper, and aluminum (Col. 11, lines 65-67).

With respect to Claim 15, the claim is rejected over the reasons stated in the rejections of claim 1 & 9.

With respect to Claims 24 & 39, the claim is rejected over the reasons stated in the rejection of claim 1.

With respect to Claim 25, the claim is rejected over the reasons stated in the rejection of claim 24 & 1.

With respect to Claim 26, the claim is rejected over the reasons stated in the rejection of claim 24 & 1.

With respect to Claim 27, the claim is rejected over the reasons stated in the rejection of claim 25 & 1.

With respect to Claim 28, the claim is rejected over the reasons stated in the rejection of claim 24 & 5.

With respect to Claim 29, the claim is rejected over the reasons stated in the rejection of claim 24 & 6.

With respect to Claim 32, the claim is rejected over the reasons stated in the rejections of claim 24 & 9.

With respect to Claim 33, the claim is rejected over the reasons stated in the rejections of claim 24 & 10.

With respect to Claim 38, the claim is rejected over the reasons stated in the rejections of claim 24 & 9.

With respect to Claim 40, Uemura teaches that the base layer (703, Figure 7) for each electron emission source including a thin film with a regular pattern of prominences and depressions at certain width, depth and intervals accommodating the carbon nanotube layer (Fig. 7).

With respect to Claim 41, Uemura teaches that the carbon nanotubes of carbon nanotube layer penetrating into the base layer but substantially unmixed with the base layer (Fig. 7).

2. Claims 1-2, 4, 24-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakada et al. (US 6455989 B1).

With respect to Claim 1, Nakada teaches discloses a field emission display (Figure 3), comprising: first (11) and second substrates (2) provided opposing one another with a predetermined gap there between to form a vacuum assembly; electron emission sources (202) provided on one of the first and second substrates; an electron emission inducing assembly (13) inducing the emission of electrons from the electron emission sources; and an illuminating assembly (phosphor, Col. 7, lines 35-38) provided on the other one of the first and second substrates not including the electron emission sources being formed, the illuminating assembly realizing images by the emission of electrons from the electron emission sources, with the electron emission sources including a carbon nanotube layer (Figure 6, 16a) and a base layer (projecting structure 161), the base layer connecting the carbon nanotube layer to the one of the first and second substrates on which the electron emission sources are provided and having conductibility for applying a voltage to the carbon nanotube layer required for the emission of electrons, and with the base layer having a predetermined thickness, and the carbon nanotube layer being provided on the base layer in a state substantially un-mixed with the base layer (Figure 6).

With respect to Claim 2, Nakada teaches that the electron emission inducing assembly (Figure 3) comprises cathode electrodes formed in a stripe pattern on one of the first and second substrates having the electron emission sources being provided on an outer surface of the cathode electrodes (13); an insulating layer formed covering the

cathode electrodes at all areas except where the electron emission sources are formed (14); and gate electrodes formed on the insulating layer in a stripe pattern and in a direction substantially perpendicular to the cathode electrodes (15), the gate electrodes including holes for exposing the electron emission sources.

With respect to Claim 4, Nakada teaches that the illuminating assembly comprises an anode electrode formed on the substrate on which the electron emission are not formed; and phosphor layer formed on an outer surface of the anode surface (Col. 7, lines 35-38).

With respect to Claim 24, the claim is rejected over the reasons stated in the rejection of claim 1.

With respect to Claim 25, Nakada teaches a second substrate (2) provided opposing the first substrate with a predetermined gap there between to form a vacuum assembly.

With respect to Claim 26, Nakada teaches an electron emission inducing assembly (13) inducing the emission of electrons from the electron emission sources.

With respect to Claim 27, Nakada teaches an illuminating assembly (phosphor, Col. 7, lines 35-38) provided on the other one of the second substrate (2), the second substrate not including the electron emission sources being formed, the illuminating assembly realizing images by the emission of electrons from the electron emission sources.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Choi et al. (US 2001/0006232 A1).

With respect to Claim 3, Nakada teaches the invention set forth above (see rejection in Claim 1 above). Nakada is silent lacks the specific structure of the gate electrode disposed on a first substrate. In the same field of endeavor, Choi teaches a teaches that the gate electrodes (Figure 2, #13) are formed in a stripe pattern on one of the first and second substrates (11) provided with the electron emission sources (15); an insulating layer (17) formed over an entire surface of one of the first and second substrates provided with the electron emission sources and covering the gate electrodes; and cathode electrodes (12) formed on the insulating layer in a stripe pattern and in a direction substantially perpendicular to the gate electrodes, the electron emission sources being formed on an outer surface of the cathode electrodes in order to ensure easier manufacturing of such an FED device (Page 4, Par [0043]). Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify the structure of the electron emission inducing assembly, as disclosed by Choi, in the field emission display of Nakada. Motivation to combine would be to ensure easier manufacturing of such an FED device.

4. Claims 7, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al. (US 6239547 B1) in view of Ito (US 6885142 B2).

With respect to Claim 7, Uemura teaches that the base layer (Figure 2) comprises an adhesive material (conductive adhesive, Col. 5, lines 41-45) realized through a glass frit; and a metal conductive material (84) selected from the group consisting of silver, copper, and aluminum (silver paste, Col. 5, lines 41-45). Uemura lacks a frit glass from the group consisting of PbO, SiO_2, Ba_2O_3. In the same field of endeavor, Ito teaches a glass frit that selected from the group consisting of PbO, SiO_2, Ba_2O_3 (Col. 2, lines 2-7) for the purpose preventing softening of the sealing portion including the frit glass during device manufacturing (Col. 2, lines 2-7). Ito teaches the suitability of using a glass frit formed of the group consisting of PbO, SiO_2, Ba_2O_3. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the composition of the group consisting of PbO, SiO_2, Ba_2O_3, as disclosed by Ito, in the device of Uemura in order ensure the prevention of softening of the sealing portion including the frit glass during device manufacturing and to choose from one of the materials disclosed by Ito, since Ito teaches the suitability of using a glass frit formed of a the group consisting of PbO, SiO_2, Ba_2O_3 and it has been held to be within the general skill of an artisan to select a known material on the basis of the intended use. See MPEP 2144.07.

With respect to Claim 30, the claim is rejected over the reasons stated in the rejections 24 & 7.

5. Claims 14, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Lee et al. (US 2002/0175617 A1).

With respect to Claim 14, Nakada teaches the invention set forth above (see rejection in Claim 1 above). Nakada is silent regarding the thickness of the base layer. In the same field of endeavor, Lee teaches that the base layer (nanotube emitter layer, Figure 2, #52) is formed at a thickness of 0.05 to 5 μm (Page 3, Par [0016]) in order to ensure sufficient mechanical support of respective nanotubes. Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify the thickness of the base layer, as disclosed by Lee, in the field emission display of Nakada. Motivation to combine would be to ensure sufficient mechanical support of respective nanotubes.

With respect to Claim 37, the claim is rejected over the reasons stated in the rejections of 24 & 14 (above).

6. Claims 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura et al (US 6239547 B1) in view of Cole et al. (US 6919730 B2).

With respect to Claim 34, Uemura teaches the invention set forth above (see rejection in Claim 24 above). Uemura is silent regarding the dimensions of the prominence and depressions of the base layer. In the same field of endeavor, Cole teaches that the prominence and depressions (combination of 220 & 235, see at least Fig. 2D) at 0.05 to 10 μm width, 0.01 to 5 μm depth, and 1 to 20 μm intervals (Col. 3, lines 17-27) in order to provide the ability to better control temperature response of a plurality of nanotubes to radiation. It should be noted that the Cole's temperature

sensor (235) acts as a baseline surface for providing the platform-sensor combination with respective depressions. Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify the dimensions of the prominence and depressions of the base layer, as disclosed by Cole, in the field emission display of Uemura. Motivation to combine would be to provide the ability to better control temperature response of a plurality of nanotubes to radiation.

7. Claims 11, 16, are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Cole et al. (US 6919730 B2).

With respect to Claim 11, Nakada teaches the invention set forth above (see rejection in Claim 1 above). Nakada is silent regarding the dimensions of the prominence and depressions of the base layer. In the same field of endeavor, Cole teaches that the prominence and depressions at 0.05 to 10 μm width, 0.01 to 5 μm depth, and 1 to 20 μm intervals (Col. 3, lines 17-27) in order to provide the ability to better control temperature response of a plurality of nanotubes to radiation. It should be noted that the Cole's temperature sensor (235) acts as a baseline surface for providing the platform-sensor combination with respective depressions. Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify the dimensions of the prominence and depressions of the base layer, as disclosed by Cole, in the field emission display of Nakada. Motivation to combine would be to provide the ability to better control temperature response of a plurality of nanotubes to radiation.

With respect to Claim 16, the claim is rejected over the reasons stated in the rejection of claims 1 & 11.

With respect to Claim 34, the claim is rejected over the reasons stated in the rejection of claims 1 & 11.

8. Claims 12, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Cole et al. (US 6919730 B2) with further consideration to Mau et al. (US 6866801 B1).

With respect to Claim 12, Nakada-Cole teaches the invention set forth above (see rejection in Claim 1 above). Nakada-Cole fails to teach the claimed composition of the prominence and depressions of the base layer. In the same field of endeavor, Mau teaches that the prominence and depressions are formed of indium thin oxide (Col. 2, lines 65-67 – Col. 3, lines 1-8) in order to provide sufficient thermal stability according to the [CNT growth] synthesis temperature applied (Col. 2, lines 56-67). Mau teaches the suitability of using a thin film is formed of indium thin oxide. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the composition of the indium thin oxide, as disclosed by Mau in the device of Nakada-Cole in order to provide sufficient thermal stability according to the synthesis temperature applied and to choose from one of the materials disclosed by Mau, since Mau teaches the suitability of using a thin film formed of a indium thin oxide and it has been held to be within the general skill of an artisan to select a known material on the basis of the intended use. See MPEP 2144.07.

With respect to Claim 35, the claim is rejected over the reasons stated in the rejection of claims 1 & 12.

9. Claims 13, 17, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Lee et al. (2002/0175618 A1).

With respect to Claim 13, Nakada teaches the invention set forth above (see rejection in Claim 1 above). Nakada is silent the respective densities of the base layer and carbon nanotube layer. In the same field of endeavor, Lee teaches a carbon nanotube density of the carbon nanotube layer being greater than the carbon nanotube density of the base layer (Page 3, Par [0018]) in order to improve electron emission characteristics. Therefore, it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify the densities, as disclosed by Lee, in the field emission display of Nakada. Motivation to combine would be to improve electron emission characteristics.

Nakada-Lee teaches the claimed invention except for the specific limitation of the carbon nanotube density of the carbon nanotube layer being "100 to 1,000,000 times" a carbon nanotube density of the base layer. However, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide carbon nanotube density of the carbon nanotube layer being "100 to 1,000,000 times" a carbon nanotube density of the base layer, since optimization of workable ranges is considered within the skill of the art. Further, one of ordinary skill in the art would entertain the idea of providing a substantially greater amount of the carbon nanotubes in

the carbon nanotube layer in order to ensure sufficient emission of the field emission display.

With respect to Claim 17, the claim is rejected over the reasons stated in the rejection of claims 1 & 13. The base layer (projecting structure 161 of Nakada) having an outer surface that includes prominences and depressions (the plurality of 161 throughout he device, as a whole, conclude the very prominences and depressions overall).

With respect to Claim 36, the claim is rejected over the reasons stated in the rejection of claims 1 & 13.

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Choi et al (US 6504292 B1) teaches a metallized substrate (2 coated with 5), and CNT 10 in the depressions (see Fig. 5b).

Response to Arguments

Applicant's arguments filed on 11/27/06 have been fully considered but while some are not persuasive, other arguments are persuasive.

II. Claim Rejections – 35 USC § 102

A. Regarding Claims 1, 5-6, 8-10, 15, 24-29, 32-33, 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Uemura et al (US 6239547 B1).

1. Regarding Claims 1, 24, Applicant argues that Uemura does not indicate a predetermined thickness for the base layer. Examiner respectfully disagrees. That

Uemura discloses *some* base layer (422) utilized to "fix" the graphite columns (421) to some substrate, suffices that the distinction of a base layer, different from that of the graphite columns, establishes that Uemura's base layer thickness must fall within some predetermined thickness.

Furthermore, Applicant argues that Uemura fails to disclose the carbon nanotube (hereinafter referred to as CNT) layer being provided on the base layer in a state substantially un-mixed with the base layer. Examiner respectfully disagrees. The degree at which the CNT is unmixed is determined by the fact that a distinction between the two different layers is made (1) a graphite column layer (distinguished as 421) and (2) a base layer (distinguished as 422) used as a binder. Hence, the CNTs are inherently substantially unmixed.

Regarding Fig. 7, Col. 12, lines 39-48, Examiner invites applicant to indicate where Uemura teaches that the CNTs are "substantially embedded" in the base layer. That the electron-emitting terminals of Uemura's CNTs are hidden in Fig. 7A, the terminals of the CNTs are clearly exposed, in Figs. 7C & 7E, as a result of irradiation of the top portion of the subsequent silver particles of the base layer.

2. Regarding Claim 8, Applicant argues that Uemura fails to teach the prominences and depressions of the base layer. Examiner respectfully disagrees. The prominences and depressions, as refuted by Applicant in Fig. 7, are clearly shown in Figs. 7C & 7E, wherein the prominences and depressions are a subsequent result of the exposed CNT terminals.

3. Regarding Claims 9, 15, 32, 38, Applicant argues that, due to the amendment, Uemura does not teach the spherical particles below the CNT layer. Examiner respectfully disagrees. Tying to the same concept of a notable distinction between the two different layers is made (1) a graphite column layer (distinguished as 421) and (2) a base layer (distinguished as 422) used as a binder, hence having a substantial degree of unmixing, the spherical particles, such as Ag, are inherently formed below the provided CNT layer. For further clarification, examiner additionally refers to Col. 11, lines 13-17, wherein Uemura discloses the graphite column power layer being "deposited **on** not only the conductive adhesive (applicant's "base layer") ..." That a deposition of CNT is practice upon the preset conductive adhesive, teaches that while there may be *some* mixing of CNT and base layer, a separation is present nonetheless.

B. Claims 1-2, 4, 24-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakada et al. (US 6455989 B1).

1. Regarding Claims 1, 24, Applicant argues that Nakada's projecting structure 161 is not structurally comparable to the base layer of the present invention. Examiner respectfully disagrees. That the CNT layer is provide on Nakada's projecting structure is basis alone for substantiating its entitlement as the claimed "base layer." Inherently, *any such layer* that a CNT layer is formed on may be portrayed as a base layer thereof.

Applicant further argues that Nakada fails to disclose the CNT layer being provided on the base layer in a state substantially unmixed with the base layer. Examiner respectfully disagrees. That a distinction is made between Nakada's

projecting structure 161 and Nakada's CNT layer 16a is basis enough for the two layers, one being formed on the other to be substantially unmixed.

III. Claim Rejections – 35 USC § 103

A. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Choi et al. (US 2001/0006232 A1).

Regarding Claim 3, Applicant argues that the motivation given by the Examiner of "easier manufacturing," is a broad generalized statement that is not clear and particular and not from the references themselves. Examiner respectfully disagrees. Paragraph 0043 of Choi clearly state that the gate electrodes installed below the cathodes, on a substrate, so that the "manufacture of the devices is **easy**."

B. Claims 14, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Lee et al. (US 2002/0175617 A1).

Regarding Claims 14, 37, Applicant argues that the rejection is improper. Examiner respectfully disagrees. Lee's thickness is taught at a particular threshold, the threshold particular apt to tolerate the support of respective CNTs. If the tolerance was nonexistent, then the threshold for Lee's thickness would be rendered inadequate. That Lee teaches a functional embodiment, disclosing the claimed thickness, deems the motivation proper in the provided rejection.

C. Claims 8, 11, 16, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Cole et al. (US 6919730 B2).

Regarding Claims 11 and 16, Applicant argues that Cole does not mention the depth. Examiner respectfully disagrees. Cole discloses that the "platforms are 1-5

micron rectangles ..." This implies that the platforms have two pairs of opposite sides of that are of equal length, but that all four sides fall within 1-5 microns. Hence, the depth is adequately provided.

Applicant further argues that the Ni islands are not included in the base layer. The relevance of the Ni island not being included in the base layer is unclear. Cole's platform, combination of final product, 220 & 235, are the relevant features in the structural platform.

D. Claims 13, 17, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al. (US 6455989 B1) in view of Lee et al. (2002/0175618 A1).

Regarding Claims 13, 17, 36, Applicant argues that the combination rejection is improper. Examiner respectfully disagrees. That the applicant claims the CNT density to be 100 to 1,000,000 times a carbon nanotube density of the base layer fails to establish function of criticality. Hence, it would have been an obvious matter of design choice to a person of ordinary skill in the art to choose the CNT density to be 100 to 1,000,000 times a carbon nanotube density of the base layer because Applicant has not disclosed a function of criticality.

For the reasons stated above, the rejection of some of the claims is deemed proper, while the rejection of some of the claims are withdrawn.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hana A. Sanei whose telephone number is (571) 272-8654. The examiner can normally be reached on Monday- Friday, 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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